October 14. The skin was dissected up, the patient being under the influence of nitrous oxide gas, lateral oval flaps were made, and a circular division of the muscles. The anterior tibial and peroneal nerves after division were well drawn down and severed high in the sheath.

November 25. Was discharged with an excellent stump and with no return of the neuralgia.

Report of Dr. MORRIS LONGSTRETH, who examined the portions of nerves removed.

The specimen shows the integument covering the end of the stump contracted in a puckered cicatrix, and is marked with deep furrows. The integument is tightly adherent to the bones, and its connection with the muscles consists of firm bands of connective tissue. The tibia and fibula are evenly rounded, with their extremities, perhaps, unduly enlarged. The nerve trunks, viz., the posterior tibial and both branches of the peroneal, are all enlarged, and terminate in bulbous extremities which are adherent to the cicatrix by dense fibrous tissue.

Microscopic examination of the enlarged portion of the nerves showed them to be composed mainly of fibrous tissue, a few nerve fibrils only passing through them. For a short distance above the bulbous extremities the fibrous tissue in the nerve trunk was much increased.

The following are the measurements of the nerve trunks in their healthy portions and of their bulbous extremities.

The branches of the external popliteal or peroneal nerve.

I.	Anterior tibial branch:	
	Diameter of the healthy portion	$\frac{1}{8}$ inch.
	" " bulbous enlargement	$\frac{1}{4}$ to $\frac{1}{3}$ inch.
	Length " " "	$\frac{2}{3}$ inch.
II.	Musculo cutaneous branch:	
	Diameter of the healthy portion	$\frac{1}{8}$ to $\frac{1}{6}$ inch.
	" " bulbous enlargement	$\frac{1}{3}$ inch.
	Length " " "	nearly 1 inch.
III.	Posterior tibial nerve:	
	Diameter of the healthy portion	$\frac{1}{4}$ inch.
	" " bulbous enlargement	$\frac{1}{2}$ inch.
	Length " " "	$\frac{3}{4}$ inch.

PHILADELPHIA, August, 1873.

ART. IV.—*On the Difficulties attending the Diagnosis of Aneurism, being a Contribution to Surgical Diagnosis and to Medical Jurisprudence.*

By STEPHEN SMITH, M.D., Surgeon to Bellevue Hospital, New York.

IN a former number of this Journal (April, 1873) the difficulties of diagnosis of aneurism from abscess were considered and illustrated with cases. The present article is a continuation of the same general subject.

I. ANEURISM AND NON-MALIGNANT TUMOURS.—In its progressive changes an aneurism may assume all the apparent conditions of the different forms of tumour. It may be very soft and fluctuating, and be mistaken for a cyst, even when pulsation and a bruit are present; or a cyst lying over an artery may fluctuate, pulsate, and have a bruit, and be diagnosed an aneurism and treated accordingly. Again, an aneurism may become firm and resemble a fibrous tumour, or it may have points of fluctuation like a fibro-cystic growth. The liability in diagnosis to error under these various circumstances and conditions is very great, as the records of surgery prove. The course which the surgeon should take in such cases is very important, and his position is often embarrassing. In the midst of doubt and danger he is liable to act imprudently, perhaps rashly, and the mistakes which he makes may be of the most serious nature. Under these circumstances he cannot do better than to follow the advice of one of the most eminent surgeons of the past. Boyer says:—

> "In many cases it is impossible to pronounce in a positive manner, if a tumour placed over a large artery be an aneurism, or a tumour of another nature. In this doubtful case we ought to conduct ourselves as if the tumour were really an aneurism. In conforming to this rule it will no doubt happen that sometimes we shall not touch tumours the opening of which is proper and safe. But the inconveniences that may result from this, are not comparable with the danger to which the patient would be exposed by opening an aneurism instead of a tumour of another nature."

1. *Aneurism mistaken for Cystic Tumour.*—If an aneurism should have very thin walls, and should not have the ordinary signs, as pulsation, bruit, expansion, it would almost inevitably be mistaken for a cystic tumour. Nor could the error be corrected except by puncture. Such cases must necessarily be extremely rare, for it is the unconsolidated aneurism which gives pulsation as its constant and most reliable symptom. But experience proves that an aneurism with thin walls may exist without pulsation, and so closely resemble an encysted tumour as to lead to an operation for its extirpation. Though the following case was "rare and remarkable," still it deserves insertion, if for no other purpose than to demonstrate the fact that all symptoms are liable to deceive the surgeon in the diagnosis of aneurism. It was reported in the *Am. Journ. Med. Sci.* (vol. iv. p. 237, May, 1829).

> A boy received a blow on the left temple ; a tumour was developed which was supposed to be encysted, and extirpation was attempted. The excision was immediately followed by profuse hemorrhage, which was arrested by compression ; the patient had convulsions, which soon terminated in death. The extirpated tumour was an aneurismal sac communicating with the middle meningeal artery, by an opening situated between the squamous border of the temporal and the corresponding portion of the parietal bone. The middle meningeal artery was of the size of a finger fifteen lines lower than the opening. A depression in the brain under the aneurismal dilatation contained one and a half ounces of bright blood.

2. *Cystic Tumour mistaken for Aneurism.*—If a cystic tumour should happen to be placed over an artery, it may with nicest accuracy respond to most of the tests of an aneurism. It may pulsate freely, and if it partially envelops the artery, the pulsation may be expansive. It may have a bruit sufficiently well marked to be deceptive, and it may to a certain extent recede, but not collapse when pulsation is arrested. In cases of this kind a correct diagnosis seems to be impossible without a resort to punc-

ture. And if it were a sanguineous cyst, even this test might fail to make the diagnosis positive.

Prof. Syme (*Edin. Monthly Journ.*) reported the following instructive case of this kind in which all the difficulties of diagnosis are graphically set forth :—

"A young man had a swelling in his neck, seated on the right side, occupying the upper triangular space, of an oval form, quite circumscribed, and obviously consisted of a bag containing fluid; there was distinct pulsation characteristic of aneurism; patient stated that the swelling commenced nine months ago, and had progressively enlarged without any apparent cause; when he worked hard or walked fast, it increased in size and beat strongly; varied the process of examination by placing him in different positions—by trying the effects of pressure on the artery and the tumour—and by listening to the sounds of the tumour. There was no distinct aneurismal 'bruit,' but a very strong, loud pulsation, that implied the action of the heart upon an extensive surface. After much reflection advised an operation; tied the carotid below the crossing of the omo-hyoideus; tumour immediately diminished in bulk, which was remarked even by the patient; went on well for five days, when hemorrhage took place from the wound, recurring from time to time, and finally proving fatal. On inspection a tumour was found extending from the ear to the extremity of the omo-hyoideus, and completely occupying the upper triangle of the neck. At the lower part it seemed to terminate in the sheath of the vessels, which looked like a prolongation of it downwards, but was found to be merely enveloped by the bag, which was dissected out from the coats of the vessels to which it had intimately adhered. The cyst was found to contain a fluid like thin gruel, and it possessed a tough consistence. At the posterior part, viewed internally, it displayed a sacculated or honey-comb-looking structure."

It is noticeable that in this case all the symptoms of aneurism were present except a bruit. The absence of this symptom was in reality the most important fact elicited by the examination, for cystic tumours overlying arteries are not in general sufficiently compressible to so interrupt the flow of blood in the artery as to give a distinct, or in any sense a characteristic bruit. The "strong loud pulsation that implied the action of the heart upon an extensive surface," is precisely the auscultatory sign of a cystic tumour lying in immediate contact with the artery. Mr. Syme, on the contrary, was influenced more by the expansive pulsation of the tumour, a symptom which is in general so characteristic of aneurism. The following explanatory remarks are of interest, as they prove the doubt and uncertainty which the most eminent surgeons experience in the diagnosis of aneurism :—

"I have had extensive opportunities of observing tumours of an aneurismal kind, and it was impossible for me to bestow more care in any instance than in the case just related. But the character which I have hitherto regarded as the most certain indication of aneurism may be presented by a peculiar state of things of an entirely different kind. I allude to the general expansive pulsation, especially when felt in a lateral direction. This was most distinctly recognized not only by myself but by several gentlemen well practised in the diagnosis of aneurisms, who agreed with me in the belief that an aneurism existed. Having come to this conclusion, and being requested by the patient to do what seemed proper, I had no course but to tie the artery. The low situation to which the ligature was restricted, the consequent proximity of the innominata, and the intimate adhesion of parts, no doubt led to the hemorrhage."

A case not unlike the preceding was recently treated in Bellevue Hospital. The tumour was situated in the inferior and external triangle of the neck, had distinct pulsation, but no well-defined aneurismal bruit; the diffused impulse was noticed. A consultation of surgeons decided in favour of aneurism, and the operation of ligature of the subclavian was advised. A ligature was accordingly placed around the artery, but before it was tied the cystic nature of the tumour was discovered by puncture.

Breschet (GUTHRIE, *Inj. and Dis. of Art.*) reported a case of what was regarded as an encysted tumour, which communicated with the aorta.

The subject was a child, æt. 10 years, who had several abscesses form after scarlet fever. A tumour formed on the anterior superior part of the thorax, extending to the left side of the neck. A student of medicine, believing this tumour to be an abscess, punctured it, when a jet of blood was thrown out, and it continued to flow until the tumour was emptied. A stimulating injection was used and compression resorted to by compress and bandage. On the next day the tumour refilled and pulsated; on the second day she died. On examination the sac was found to consist of two parts, one external and the other internal, the communication being through a carious hole in the bone; the internal cavity communicated by a very small opening with the interior of the aorta on its anterior face, and near the carcinomata.

The existence of an encysted tumour in this case was very doubtful; it is much more probable that there was suppuration, and that the aorta was opened by the process of ulceration consequent upon pressure.

3. *Fibro-Cystic Tumour mistaken for Aneurism.*—A tumour of a solid character, but interspersed with cysts, as in the fibro-cystic variety, may be so related to an artery, as to give the most positive evidence of being an aneurism. In these cases expansive pulsation may be present, and also an imperfect aneurismal thrill. Such tumours, in contact with an artery, resemble in many important particulars the cystic variety. They admit often of marked expansion, and being more directly compressible upon the artery, they give a more definite bruit. The following case (*Lond. Med. Times*) shows how difficult the problem of diagnosis may be to solve with the data given.

A soldier was admitted to the hospital with a swelling in the left ham as large as a goose's egg, partly compact, partly fluctuating, and distinctly pulsating on moderate pressure; came on suddenly, three weeks previously, while walking; diagnosis aneurism; compression was tried, and afterwards the femoral artery was tied. The tumour, however, continued to grow, and the patient finally died of pulmonary trouble. On examination the tumour was found to be fifteen inches long, and twenty-four in circumference, pear-shaped, lobed, and firmly adhering to the periosteum of the tibia and femur. On the surface were five sacculi containing five or six ounces of sero-sanguinolent fluid, and apparently formed by the separation of the two layers, of which a tough fibrous membrane enveloping the whole tumour was composed. The tumour itself consisted in part of a dry fibrous reticulated tissue divided by partitions of loose tissue into lobes, and separated into two chief portions by a plate of bone; and in part of a softer substance, easily broken, rose-coloured, interspersed with fibrous tissue, and containing many cells filled with serous fluid. The femur and tibia were healthy. The artery ran over the tumour, and between two of the sacs of fluid on its surface, and through these its pulsations had been so communicated as to give the sensation of the whole tumour pulsating.

It does not appear in this case that auscultation was resorted to; but there can be no doubt that a bruit might have been well marked. The proper test of such a tumour, as in the cystic variety, would be cautious exploration. In no other way could its nature have been satisfactorily determined. And yet it must be noticed that even a puncture might have misled the surgeon, for in the middle portion, where doubtless pulsation was most distinct, the exploring needle might have penetrated the artery, and possibly have obtained a jet of blood, which would have confirmed the diagnosis of aneurism. The exploration, to be of value in this instance, must be in the lateral parts of the tumour. And this rule in regard to the selection of the point of exploration of all tumours suspected to be aneurismal is important, as we thereby avoid the artery.

4. *Vascular Tumour mistaken for Aneurism.*—Vascular tumours, especially the arterial variety, often simulate aneurisms very accurately. They may pulsate expansively and have a bruit which though not characteristic of the aneurismal thrill, is yet liable to be mistaken for that of aneurism; they cease to pulsate when firm pressure is made on the proximal portion of the artery, partially collapse, and again refill when the pressure is removed; they cannot be raised from the artery any more than an aneurism; if punctured, they give issue to arterial blood. Though an erectile tumour is generally more flat and less circumscribed than an aneurismal tumour, yet this is not always the case. The following case, reported by Dr. Kerr (*Ed. Med. and Surg. Journ.*, vol. 61), is in point:—

Mrs. F., 67 years of age, had on the right side of her neck a large circumscribed tumour, pulsating strongly, and extending from the angle of the jaw to the sternum and clavicle. At the lower part of the swelling mortification had made considerable progress, and arterial blood oozed occasionally from the sloughing portion. The sloughing process had penetrated nearly an inch in depth, and this circumstance, together with the firmness of the tumour, led to the opinion that it contained a large quantity of coagula. The tumour had very much the appearance of an aortic aneurism, which it was supposed to be, a careful examination not being made for fear of a fatal hemorrhage taking place. Under treatment the bleeding ceased; the dead parts separated, and the sore nearly cicatrized; tumour temporarily diminished in size. The danger of immediate hemorrhage being past, a careful examination was made. The trunk of the carotid was traced around the outer and posterior part of the tumour, being greatly displaced by it. Pressure on the artery below its bifurcation arrested the pulsation in the tumour. The swelling had begun twenty years previous, when it appeared about the size of a pea, near the angle of the jaw after a severe fit of coughing, remaining stationary for about ten years, when it began to increase, in consequence of the patient having made such exertions as were calculated to excite the action of the vascular system, until it finally reached its present magnitude. All these facts, together with the characteristics of the tumour, left little doubt of the case being one of aneurism of the carotid commencing at the usual place or at the origin of one of the branches, this being the opinion entertained by all those who saw the case. The *bruit de soufflet* was distinctly perceived with the stethoscope, and the thrilling sensation so characteristic of aneurism was strong on the cardiac side. The swelling again began to increase, giving rise to distress from pressure on adjoining parts, and the common carotid was ligated, the wound cicatrizing rapidly; tumour diminished greatly in size, and the pulsation entirely disappeared. Nine months after the operation the patient died of pneumonia, and on examination it was discovered that the artery was perfectly sound. The tumour seemed to be made up of cellular tissue and vessels loaded with blood, a large branch of the carotid leading into it and from which it seemed to derive its whole supply.

5. *Aneurism mistaken for Solid Tumour.*—An aneurism may become so far consolidated as to lose its characteristic features. This may occur while the tumour is small, or after it has attained to a considerable size. Pulsation may continue, but it has very nearly the character of the pulsation of a tumour situated upon an artery. The early history of the tumour is of great importance, and, if accurately given, may guide the surgeon to a correct conclusion. If, however, the early history is obscure, or unreliable, and the surgeon is compelled to rely upon his examination of the tumour itself, the diagnosis is often involved in great doubt and uncertainty.

In the following case reported by Mr. Lawrence, pulsation was not present, nor did the patient recollect that it was ever noticeable. Auscultation was not practised, and if it had been there is much doubt as to the existence of a characteristic bruit. (*Med. Chir. Trans.*, vol. 8.)

A middle-aged man was received into Saint Bartholomew's Hospital, with a large tumour filling up the whole ham, and extending on both sides of the femur towards the front of the limb. It had begun behind; had existed for five months; had grown latterly with great rapidity, and manifestly increased during a few days; had a firm fleshy feel, being a little softer at one of its anterior protuberances than in other parts; caused great pain, though it was not tender on being handled; had caused considerable œdema of the leg and foot, and had rendered the limb completely useless. The surgeons of the hospital in consultation regarded it as a large and rapidly increasing fleshy tumour, and decided that amputation of the limb was the only remedy that could be proposed. This was performed high up, having first plunged an abscess lancet into the softest part of the tumour to the whole depth of the blade, without giving issue to any fluid.

The examination of the amputated limb discovered that this tumour was a popliteal aneurism, containing an immense mass of firm bloody coagulum; not of that light-brown laminated kind, which lines old aneurismal sacs, nor of the loose and soft texture that belongs to recently clotted blood. Hence, although the sac had been freely penetrated by the abscess lancet, no part of its contents escaped.

6. *Fibrous Tumour mistaken for Aneurism.*—A fibrous tumour forming over an artery may receive pulsation and have a bruit, but neither are characteristic of well-developed aneurism. But a consolidated aneurism will sometimes give very nearly the symptoms of a solid tumour, and cannot very easily be distinguished from it. The history is then the most important feature of the case, and if that is unreliable the diagnosis must be involved in great doubt. If a fibrous tumour is small it may be raised from the artery, and thus its nature may be determined, but if larger, this test is of no value. The following case presents many of the more important features of a doubtful case. (*Lond. Lancet*, Jan. 4, 1873.)

A woman, æt. 64, accustomed to carry a heavy basket which constantly bruised the thighs, seven months since noticed a swelling size of hen's egg on inner side of left thigh; it grew slowly for four months, and then rapidly; now extends from junction of lower and middle third of thigh to within two inches of Poupart's ligament; is ovoid in shape, smooth, and elastic, and has throughout a faint pulsation; femoral artery is felt along outside of the tumour pulsating distinctly; no change in pulsation in ham and at the ankle; pressure upon the femoral at the groin stopped all pulsation, but did not diminish the size of the tumour; the sphygmograph placed upon any part of the tumour gave marked evidence of pulsation by the free movement of its pointer; on exploration blood flowed; tumour varied in size and distinctness of pulsation from day to day; diagnosis uncertain and femoral artery was ligated as the most rational procedure in the event of the tumour being an aneurism of the profunda or a solid tumour. Pulsation was arrested, and tumour diminished slightly in size; subsequently it enlarged somewhat. Gangrene of the limb occurred subsequently, and proved fatal. The tumour was fibrous and attached to the linea aspera; the femoral artery ran over its surface.

The sphygmograph was used in this case to test pulsation, and it proved that there was pulsation in all parts of the tumour. And yet it is to be noticed that the femoral artery ran along the outside of the tumour. This instrument would seem to have misled rather than aided the surgeon, as it indicated pulsation throughout the tumour, when that pulsation was only an impulse feebly communicated to the mass from an artery lying quite external. Little or no importance seems to have been attached to the fact that the pulsation in the ham and at the ankle was unchanged.

7. *Neuroma mistaken for Aneurism.*—Closely allied to the fibrous tumour is neuroma, which may be so situated as to receive the impulse of an artery and be mistaken for an aneurism. In the case reported by Mr. Earle (*Lond. Med. Gaz.*, vol. 16) the most careful examinations were made, and that, too, repeatedly by surgeons of St. Bartholomew's Hospital in consultation, and yet the mistake was made of ligating the subclavian artery for a neuroma of an axillary nerve. The error was not discovered until the patient's death from another disease five years after the operation, and when he was supposed to have recovered from the aneurism. The case has many points of interest worthy of special notice.

"T. B., æt. 54, iron-plate worker, had a pulsating tumour situated immediately below the left clavicle; had been gradually increasing ten months; size of half an orange; lower part hard and without pulsation; upper part softer and pulsation distinct; no additional evidence afforded by the stethoscope; supposed to be aneurism of the subclavian artery where it passes the clavicle; pulsation in the humeral and radial arteries as strong as on the healthy side; this circumstance and the firmness of the greater part of the tumour led to the hope that a spontaneous cure by obliteration of the aneurismal pouch might be effected without arresting the current in the direct course of the artery; treatment consisted in low diet, saline medicines, moderate and repeated bleedings, and applications of pounded ice; tumour remained stationary as to size, and its pulsation diminished; pulsation of the artery beyond the tumour remained free and undiminished; at a consultation all the circumstances were discussed, particularly the undiminished strength of the pulsation of the artery beyond the tumour; the prevailing opinion was that the force of the circulation below was a proof of the free ingress of blood into the pouch, which of course made the probability of a spontaneous cure very slight; the patient was now in better condition for the operation, and delay might possibly cause the tumour to increase, raising more the clavicle, and thus rendering the operation more difficult; it was decided to operate. On the third day following, the tumour seemed to be increasing in a direction beneath the clavicle, and on the next day the operation was performed. On introducing the finger into the wound, the aneurismal tumour was felt pulsating, and the clavicle was considerably raised from the first rib. The bulk of the tumour was very slightly diminished after the operation, and the contents of the sac felt very firm. The patient's health continued very precarious for some time, but after his removal from the hospital it improved and his wound gradually closed; but he continued to have pain in the tumour, inflammation around it took place and finally suppuration, he returning to the hospital after a few weeks' absence to have the abscess opened. A large quantity of unhealthy pus was evacuated; after some time the opening was enlarged, and a quantity of thick matter, supposed to be laminated coagula, came away, after which the abscess healed, leaving hardly a perceptible swelling beneath the clavicle; the tumour also subsided. He returned to work, the pulsation at both wrists being almost equal in strength; complained of a sense of coldness and numbness down the left arm. From 1830 to 1835 he was under my occasional observation, and finally he was re-admitted with general dropsy and great exhaustion, under which he died on the second of July of the latter year. At the autopsy a tumour was found an inch below the clavicle, oblong in shape, two inches in length by one and a half in width, lying upon and in the direction of the axillary plexus of nerves. The axillary artery was firmly united to one side by dense cellular tissue, the other side being intimately connected with the axillary nerves. The tumour consisted of grayish dense substance divided by white lines extending through it in various directions. A large nerve of the axillary plexus was attached to the upper, and another similar nerve to the lower end of the tumour, both being split into filaments at either end, which extended into the interior and on the surface of the tumour. The subclavian artery had been ligated upon the first rib."

In reviewing this case Mr. Earle remarks that it "furnishes powerful negative evidence in favour of auscultation, as certainly the usual sound of aneurism was absent." It is true that the absence of auscultatory signs was in itself evidence of the non-existence of aneurism, but by no means conclusive. As has been seen in many other cases, auscultation yields very equivocal evidence of the existence of aneurism. There may be no bruit whatever detectable when aneurism is present,[1] and there may be a well-defined bruit closely approximating the aneurismal without the presence of aneurism, or finally, there may be every shade of bruit with or without aneurism, except perhaps the so-called aneurismal thrill when acutely marked in aneurism.

Another symptom in this case which received the attention of the consultation was the undiminished pulsation of the arteries beyond the tumour. Ordinarily this would be regarded as one of the more important signs of the non-aneurismal character of the tumour. In this case, however, it was construed as evidence of the free entrance of blood into the cavity of the aneurism, and unfavourably to a spontaneous cure. This opinion was evidently erroneous, for the volume of pulsation of the arteries beyond the tumour diminishes in proportion to the freedom with which the current of blood enters the aneurism. No variation in the pulse of the affected limb would indicate that the current was uninterrupted, and would lead to the conclusion either that no aneurism existed, or if it existed that the cavity was closed. And yet, as will appear in the course of this paper, aneurisms may exist, and the distal arteries pulsate with undiminished force.

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[1] "Such was the case in a woman under Mr. Vincent's care at St. Bartholomew's Hospital, in whom an aneurism followed the occurrence of a longitudinal rent in the posterior tibial artery, on its anterior face. The sac being formed at the posterior part of the artery, the stream of blood seemed to enter it indirectly. Hence probably the absence of pulsation. Nor was there any bruit. The diagnosis was only made after a long course of treatment, by an exploratory incision, when amputation became immediately necessary."—*Holmes' System of Surgery*, vol. iii.

We shall in a future paper consider the diagnosis of aneurisms from malignant growths, from pulsating tumours of bone, from enlarged thyroid, etc. etc.

ART. V.—*A Contribution to the Anatomy of the Jugular Foramen.* By THOMAS DWIGHT, Jr., M.D., of Boston, Professor of Anatomy at the Medical School of Maine. (With three wood-cuts.)

THE objects of this paper are: 1st, to call attention to the great and, as far as the writer knows, undescribed variations of the jugular fossa, that part of the temporal bone which, together with the occipital, forms the *foramen lacerum posterius;* 2d, to consider the differences which the fossa, the foramen, and the neighbouring foramina present on the two sides of the same skull; and, 3d, the effect of these differences on the cranial circulation.

A. The size and shape of the jugular foramen depend to a certain extent on the formation of the jugular eminence and notch of the occipital bone, but far more on that of the notch of the temporal bone, while the lower aspect of the opening, and the jugular fossa for the enlargement of the internal jugular vein, depend almost entirely on the latter. The fossa is liable to great variations, and presents all the appearances intermediate between two extreme types, one of which is very common, and is the form usually described in text-books, while the other, though far rarer, is not rare enough to be called abnormal. It is astonishing that no mention of this latter form should be found in any of the modern systematic treatises on anatomy. In the seventh edition of Quain, we are told that "a smooth, rounded, and deep depression, the *jugular fossa*, lies internal to the styloid process, it is close to the posterior margin of the bone, and completes, with the jugular notch of the occipital bone, the foramen lacerum posterius." In many cases it is neither smooth, rounded, nor deep. There is no satisfactory description of it in Sappey, Cruveilhier, nor Luschka, nor, what is more surprising, in the admirable description of the bone in Henle's *Knochenlehre.*

The jugular fossa is situated on the inferior surface of the petrous portion, or, more correctly according to Henle, on the posterior external